NORTH CAROLINA DIVISION OF AIR QUALITY

Air Permit Review

Permit Issue Date:

Region: Washington Regional Office
County: Bertie
NC Facility ID: 0800044
Inspector's Name: Betsy Huddleston
Date of Last Inspection: 12/09/2015
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Avoca Incorporated

Facility Address:
Avoca Incorporated
841 Avoca Farm Road
Merry Hill, NC 27957

SIC: 2087 / Flavoring Extracts And Syrups,nec
NAICS: 31193 / Flavoring Syrup and Concentrate Manufacturing

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: 2D .0530, 2D .0535, 2D .0958, 2D .1806
NSPS: N/A
NESHAP: N/A
PSD: BACT limit for VOC only
PSD Avoidance: N/A
NC Toxics: N/A
112(r): N/A
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Brian Conner Environmental Health & Safety Manager (252) 482-2133 PO Box 129 Merry Hill, NC 27957	David Peele Owner / President (252) 482-2133 PO Box 129 Merry Hill, NC 27957	Samuel Tynch Director of Operations/Engineering (252) 482-2133 PO Box 129 Merry Hill, NC 27957

Application Data

Application Number: 0800044.16A
Date Received: 01/13/2016
Application Type: Modification
Application Schedule: PSD

Existing Permit Data
Existing Permit Number: 01819/T45
Existing Permit Issue Date: 01/12/2016
Existing Permit Expiration Date: 12/31/2020

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2014	7.34	30.22	1021.10	21.19	0.4600	305.52	195.85 [Methanol (methyl alcohol)]
2013	11.85	27.84	1055.94	18.70	0.4600	250.74	155.43 [Methanol (methyl alcohol)]
2012	13.64	24.08	931.29	43.64	0.4430	214.72	145.25 [Methanol (methyl alcohol)]
2011	17.06	13.79	491.30	2.79	0.6600	123.95	68.53 [Methanol (methyl alcohol)]
2010	13.60	9.07	231.31	1.90	0.4200	67.49	52.54 [Hexane, n-]

Review Engineer: Betty Gatano

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue 01819/T46
Permit Issue Date:
Permit Expiration Date:

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1.0 Introduction and Purpose of Application

1.1 Facility Description & Proposed Change

Avoca Incorporated (Avoca) currently holds Title V Permit No. 01819T45 with an expiration date of December 31, 2020[1] for a chemical extraction facility in Merry Hill, Bertie County, North Carolina. The facility extracts oils and nutrients from various types of plants for use in flavorants, fragrances, food additives, and dietary supplements. The main product at the facility is sclareol/sclareolide. Sclareol is extracted from clary sage grown on farms surrounding the Avoca facility. The extracted material is converted to sclareolide offsite and purified at the Merry Hill facility. Sclareolide is the final product and is used to maintain fragrance potency in perfumes, laundry detergents, and a variety of other products.

There are four processes involved in producing sclareolide – Rotocel, Recovery, Sclareol Recrystallization Operations (SFG), and Sclareolide Operations (SDE).

In the first process, clary sage is augured to a belt that carries it to an extractor called the Rotocel. Hexane isomer is added to the extractor to strip out sclareol from the sage. Spent sage from the Rotocel is sent to a desolventizer, which drains the hexane from the sage. Volatilized hexane is condensed and collected in the solvent separation/recovery tank. Condensed water and hexane separate in this tank (hexane floats), and the recovered hexane is stored in two recycle process tanks. The sage exiting the desolventizer is hot and contains a significant amount of hexane. Most of the hexane flashes fugitively to the atmosphere when the sage is removed from the desolventizer.

The sclareol/hexane material leaving the Rotocel process is sent to the Recovery process. In this step, hexane from the sclareol/hexane mixture is flashed off in the stripper, and the sclareol is mixed in a receiving tank with methanol to further strip out hexane. The resulting purified oil settles to the bottom of the tank and is drawn into buckets. The Recovery process can produce up to 100 cans sclareol oil/day (47 lb/can).

The sclareol buckets are carried to the SFG (sclareol recrystallization) process, where the sclareol oil is crystallized into a white powder. The SFG operations currently consist of a series of tanks, two reactors, a centrifuge, and a dryer. Under Air Permit No. 01819T45, the SFG operations were expanded to add two storage/process tanks, two reactors, a centrifuge, and a dryer. A chilled water control condenser and mineral oil scrubber were added to the permit as optional controls for the SFG operations. In the SFG operations, sclareol and heptane are fed to a reactor, and the crystallized material is sent to a centrifuge and dryer. Heptane recovered from the first pass is reprocessed to recover any additional sclareol. As before, the crystallized material is sent to a centrifuge and dryer. The sclareol comes out of the dryer as a white powder. Heptane recovered from the second pass is again reprocessed to recover any remaining heptane. The residual material remaining after the final heptane recovery is a waste by-product.

The powder is bagged and shipped to an Avoca facility in Wisconsin, where the material is converted from sclareol to sclareolide by yeast (i.e., biological conversion). Sclareolide may also be purchased from a vendor in China. The sclareolide – either from Wisconsin or China – arrives at the Merry Hill facility as a white powder, which is purified in the Sclareolide Operations (SDE). The powder is placed in a tank with water and high purity hexane (40% n-hexane and 60% isohexane). The mixture

[1] This permit shall expire on the earlier of December 31, 2020 or the date the renewal of Air Permit No. 01819T44 has been issued or denied.

is processed through reactors, a centrifuge, and a dryer. The final, purified sclareolide remains a white powder.

PSD Project

A permit application for a modification under 15A NCAC 2D .0530, "Prevention of Significant Deterioration" (PSD), was received on January 13, 2016. Under this permit modification, Avoca is proposing to expand the SDE operations. The existing SDE operations will be called SDE-1 operations, and the new operations will be called SDE-2 operations. The following equipment will be added to the facility as part of the new SDE-2 operations:

- Mineral scrubber system consisting of a chilled water control condenser (ID No. CD-4002) in series with a mineral oil scrubber (ID No. CD-4003-S) installed to control:
  - One 17,900 gallon virgin solvent tank (ID No. T-4001)
  - Two 6,000 gallon process tanks (ID Nos. T-4017 and T-4018)
  - Three 4,200 gallon reactors (ID Nos. R-4004, R-4005, and R-4044) with process condensers (EX-4001, EX-4002, and EX-4003)
  - One 1,500 gallon reactor (ID No. R-4015)
  - One centrifuge (ID No. C-4001)
  - One dryer with (ID No. D-4001) with process condenser (EX-4004) and a chilled water control condenser (ID No. CD-4001)
- Process Equipment Leaks (ID No. ES-4000-F)
- SDE-2 process wastewater stream (ID No. ES-4000-WW).

The proposed project will increase volatile organic compounds (VOC) emissions by more than the PSD significant emission rate (SER) of 40 tons per year. Thus, the proposed project is subject to review and processing under 15A NCAC 2D .0530, PSD. The facility must also comply with other specific NCDAQ air pollution regulations where applicable.

In accordance with PSD requirements, Avoca has conducted a Best Available Control Technology (BACT) analysis, additional impacts (soils, vegetation, visibility) analysis, and to the extent necessary, Class I area analysis.

Other Changes

As noted previously, sclareolide from offsite is sent to Avoca to be purified in the SDE operations. Equipment to purify the sclareolide is currently permitted as "Biological Equipment for Purification of Sclareolide" and "Sclareolide (SDE) Operations." Under this modification, these two processes are being combined on the permit, and equipment is being added and/or removed as necessary to reflect the actual equipment in the existing SDE-1 operations.

Permit Renewal and Expiration Date

Avoca submitted an application for a permit renewal on October 31, 2014, or at least nine months prior to the expiration date of July 31, 2015. Therefore, the application shield as specified under 15A NCAC 2Q .0512(b) remains in effect. Because the renewed permit has not yet been issued, the expiration date was changed to December 31, 2020 when Air Permit No. 01819T45 was issued on January 12, 2016. A footnote was also added to the permit stating, "This permit shall expire on the earlier of December 31, 2020 or the date the renewal of Air Permit No. 01819T44 has been issued or denied."

1.2 Plant Location

Avoca is located at 841 Avoca Farm Road, Merry Hill, North Carolina, which is in eastern Bertie County. Bertie County has been classified as in attainment for all pollutants subject to a National Ambient Air Quality Standard (NAAQS).

1.3 Permitting History Since Issuance of Title V Permit Renewal

Permit	Issue Date	Description
01819T37	August 17, 2010	TV permit renewal issued with an expiration date of July 31, 2015.
01819T38	June 3, 2011	Air permit processed as significant modification under a 15A NCAC 2Q .0501(c)(2) for the addition of the following: • two new biomass/bio-based solids-fired boilers (18.6 million Btu per hour maximum heat input, ID Nos. ES-BB1 and ES-BB2) controlled by a cyclone (144 inches in diameter, ID No. CD-BB1C) in series with a dry lime injected bagfilter (8,900 square feet of filter area, ID No. CD-BB1BH), and • one No. 2 fuel oil-fired rotary dryer (6.0 million Btu per hour maximum heat input, ID No. ES-RD).
--	--	"Part 2" permit application for the new biomass/bio-based solids-fired boilers (ID Nos. ES-BB1 and ES-BB2) received on October 9, 2012. The permit application will be consolidated with the application for TV permit renewal.
01819T39	January 4, 2013	The air permit was reopened for cause to correct specific condition (2.1 E.7.) pertaining to MACT Subpart DDDDD for two biomass boilers (ID Nos. ES-BB1 and BB2). The condition contained an incorrect compliance date and was corrected under the permit modification.
01819T40	June 6, 2013	Air permit processed as significant modification under a 15A NCAC 2Q .0501(c)(2) to modify the SFG operations by replacing the current dryer with a new larger capacity dryer (ID No. D-3001). A new larger reactor (ID No. R-3002) equipped with a process condenser (ID No. EX-3003) was also added under this modification. The smaller reactor (ID No. R-3001) was to be used as a secondary reactor after modification.

Permit	Issue Date	Description
01819T41	November 26, 2013	Air permit processed as significant modification under a 15A NCAC 2Q .0501(c)(2). The following changes were made under the permit modification. • Updated CO and NOx emission factors for the biomass boilers (ID Nos. ES-BB1 and BB2). Stack testing performed on December 6, 2011 while firing wood showed measured emission factors of 0.068 lb/MMBtu for NOx and 0.0008 lb/MMBtu for CO. • Replaced the existing six MMBtu/hr burner on the rotary dryer with a 30 MMBtu/hr burner and added propane as a fuel. • Updated the maximum burner rating of the two (2) biomass boilers. The boilers heat input rating was increased from the permitted 18.6 MMBtu/hour each to a maximum heat input to 24 MMBtu/hour each. • Limited VOC emissions from the rotary dryer to less than 40 tpy to avoid triggering PSD requirements. • Limited n-hexane from the rotary dryer to less than 10 tons per year to avoid being subject to the 112(g) requirements listed in 15A NCAC 2D .1112. • Clarified the operating configuration of the sage drying system.
01819T42	January 27, 2014	Air permit processed as a minor modification with the following changes: • Replaced two underground storage tanks (ID No. ES-1001-2-1-P2) with two above ground storage tanks (20,000 gallons capacity each, ID Nos. ES-M-125A and 125B). • Added a new storage tank associated with the Plant Nutrient Extraction (PNE) operations (9,500 gallons capacity, ID No. ES-TK-PNE-1). • Added a sage briquette making machine (ID No. I-Briquette) with enclosed conveyors. • Added a molecular sieve (ID No. MSDU-1024) as part of the description for the Biomass Extraction operations (which was added to Air Permit No. 01819T41). • Included existing diesel emergency generator (401 horsepower, ID No. E104) to the permit.
--	--	"Part 2" permit application for changes to the SFG operations and modifications to boilers (ID Nos. ES-BB1 and BB2) and rotary dryer (ID No. ES-RD) received on May 30, 2014. The permit application will be consolidated with the application for TV permit renewal.
--	--	Permit application for renewal of the Title V permit was received on October 31, 2014.
01819T43	December 19, 2014	Air permit processed as a minor modification with the following changes: • Updated capacity of above ground storage tanks (ID Nos. ES-M-125A and 125B) to 19,500 gallons. • Added a condenser (ID No. CD-3002) to the existing dryer (ID No. D-3001) in the SFG operations.

Permit	Issue Date	Description
01819T44	March 10, 2015	Air permit processed as significant modification under a 15A NCAC 2Q .0501(c)(2), which was consolidated with a minor modification. The following changes were made under the permit modification. • Added a new dryer equipped with chilled water condenser and distillate tank (ID No. D-1002) after the centrifuge (ID No. C-1203) in the PNE operations. • Removed a underground ethanol storage process tank from the PNE operations (ID No. TK-9214). • Modified conditions to indicate the scrubbers are not required to operate during PNE and EVG operations. • Re-evaluated the operating temperature limit for the cryogenic condensers in the Botanical/Biomass Extraction Operations.
01819T45	January 12, 2016	Air permit processed as a PSD modification for the expansion of the SFG operations.

1.4 Application Chronology

Date	Event
August 21, 2015	Pre-application meeting between NCDAQ and Avoca occurred.
August 25, 2015	Tom Anderson of the Air Quality Analysis Branch of NCDAQ e-mailed personnel from US Forest Service, the Fish and Wildlife Services, and the National Park Service informing them of the project.
August 26, 2015	Jill Webster of the Fish and Wildlife Service sent an e-mail to Tom Anderson indicating that no additional information was needed for the project.
January 13, 2016	PSD permit application received.
January 15, 2016	A permit application acknowledgment letter was issued.
January 19, 2016	A copy of the PSD permit application was sent to Heather Ceron of EPA Region 4.
January 19, 2016	A letter was issued to Avoca indicating the PSD application was deemed complete.
January 19, 2016	Tom Anderson indicated via e-mail that no additional notification was needed for the FLM for the project, including the current permit application.
February 8, 2016	Comments on the permit application were received from Betsy Huddleston of the Washington Regional Office (WARO).
February 18, 2016 through March 8, 2016	The DAQ and consultants for the facility exchanged numerous e-mails regarding the BACT limit proposed in the permit application. The DAQ objected to the proposed BACT limit because required control under 40 CFR Part 63, Subpart FFFF was not accounted for in the proposed limit. In the end, Avoca agreed to meet the BACT limit accounting for controls. However, Avoca wanted to be on record that they disagreed with the regulatory approach for developing BACT (*i.e.*, NCDAQ including Part 63 in its analysis) for the SDE expansion.
April 7 and 8, 2016	In phone conversations with Betty Gatano, Dana Norvell, consultant for the facility, indicated the facility has no Group 1 wastewater streams. Ms. Norvell followed up the conversations with an e-mail on April 8, 2016.
April 11, 2016	Draft permit and permit review were forwarded for review.
April 15, 2016	Mark Cuilla, Permitting Supervisor, provided comments.

Date	Event
April 19 and 22, 2016	Betsy Huddleston from the WSRO provided comments on the permit review, followed by comments on the permit.
April 27, 2016	Dana Norvell provided comments.
May 4, 2016	A second draft of the permit and permit view was forwarded for comments.
May 6, 2016	Dana Norvell provided additional comments, which were addressed. On that same day, Betty Gatano addressed the comments and sent a copy to Dana Norvell. Dana Norvell indicated that the permit was acceptable.
May 13, 2016	PSD letters specifying the publication date were mailed/e-mailed.
May 17, 2016	The draft permit and permit review forwarded to public notice.

2.0 Modified Emission Sources and Emissions Estimates

After the SFG operations, sclareol is sent offsite to an Avoca facility in Wisconsin, where the sclareol is converted to sclareolide. The product is returned to the Avoca facility in Merry Hill for refining. Avoca may also receive sclareolide from China for refining, as noted previously.

The SDE operations are an intermittent batch process for producing a refined high purity sclareolide. The sclareolide material from offsite is mixed with high purity hexane (n-hexane and isohexane), reacted, washed with potassium hydroxide and water, centrifuged, and dried to higher purity sclareolide.

The SDE operations consists of two types of batches. The primary or extraction batch is the initial step where sclareolide is extracted using hexane, washed, centrifuged, and dried. The hexane from the extraction step is recovered and stored. After 4 or 5 extraction batches, enough hexane has been recovered to process in the recrop batch to extract additional sclareolide. Any recovered sclareolide is washed, centrifuged, and dried as before. Any hexane recovered from the second pass is reprocessed to recover any remaining solvent. The residual material remaining after the final hexane recovery is a waste by-product.

Avoca uses 40% n-hexane and 60% isohexane in the SDE operations to purify the sclareolide. Avoca tracks the usage of n-hexane and isohexane and reports solvent used as solvent lost to determine monthly emissions (i.e., a mass balance based on usage). The facility determined the maximum actual usage data and prorated this amount to the maximum potential operations to determine potential VOC emissions from the expanded process.

The maximum VOC usage for the SDE operations occurred in August 2015 and was 11.15 tons of VOC per month. This value was multiplied by a factor of 3.01 to account for maximum production in the expanded operation. The factor was determined by dividing the desired production after expansion by the current production. In other words, the desired production after expansion is 800 metric tons per year, which is approximately 3 times the maximum production levels of the SDE-1 operations (265.7 metric tons per year). Finally, the resulting value (3.01 * 11.5 tons of VOC per month) was multiplied by 12 months to arrive at annual VOC emissions after expansion, assuming VOC usage is equal to VOC emissions. The maximum, uncontrolled, VOC emissions are calculated as shown in the following equation:

Uncontrolled VOC emissions = 11.15 tons/month * 3.01 * 12 months/year = 402.9 tons VOC/year

This uncontrolled emissions estimate of 402.9 tons per year represents the total amount of VOC lost from the new SDE-2 operations and accounts for both losses through point sources and fugitive emission sources. The point sources are the process vents associated with the equipment in the SDE-2 operations. Fugitive emissions are those emissions that cannot reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Thus, fugitive emissions include not only emissions from equipment leaks (pumps, flanges, valves etc.) but emissions from other areas throughout the SDE-2 operations that are not vented through a stack (e.g., opening reactors, dryers, etc.).

Both the SDE-1 and SDE-2 operations are subject to the "NESHAP for Miscellaneous Organic Chemical Manufacturing," 40 CFR Part 63, Subpart FFFF. This regulation specifies potential emissions lost from process vents (points sources) are to be calculated from emission equations and methodology in "NESHAP for Pharmaceuticals Production," 40 CFR Part 63, Subpart GGG (40 CFR 63.1257). Vents from the SDE-1 operations are considered as Group 2 batch process vents based on emissions, while vents from the SDE-2 operations are considered as Group 1 batch process vents. As required by 40 CFR Part 63, Subpart FFFF, Group 1 batch process vents must be controlled. The new SDE-2 operations will be controlled by a chilled water condenser (ID No. CD-4002) in series with a mineral oil scrubber (ID No. CD-4003-S). Avoca has elected to control HAP emissions by 95% by weight, as allowed as one of the compliance options under 40 CFR Part 63, Subpart FFFF for Group 1 batch process vents.

As shown in the detailed calculations in Appendix B of the permit application, uncontrolled emissions from process vents in the SDE-2 operations are estimated as 51.1 tons per year. VOC emissions not lost through vents are assumed to be lost via fugitives, and fugitive emissions of VOC are estimated as 351.8 tons per year (402.9 tons per year – 51.1 tons per year).

In accordance with 40 CFR 70.2, potential emission from SDE-2 operations must account for "any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment…, if the limitation is enforceable by the Administrator." The VOC emissions of 51.1 tons per year from the process vents must be adjusted for controls required by 40 CFR Part 63, Subpart FFFF, to determine potential VOC emissions from the SDE-2 operations. Assuming a control efficiency of 95% by weight as required by the MACT, controlled emissions of VOC are estimated as 2.56 tons per year (51.1 tons per year emitted*(1-0.95)). Therefore, potential VOC emissions from the SDE -2 operations, accounting for controls, are estimated as 354.4 tons per year (351.8 tons per year + 2.56 tons per year). The table below provides a summary of the VOC emissions.

Emissions Source	Amount	Basis for emissions
VOC Emissions from Process Vents	2.56 tons per year	Equations / methodology in 40 CFR 63.1257 and shown in Appendix B of the permit application. Emissions were estimated assuming 95% control of VOC.
VOC emissions from fugitives	351.8 tons per year	Total uncontrolled VOC emissions – VOC emissions from process vents 402.9 tons per year – 51.1 tons per year
Potential VOC emissions from SDE-2 operations	354.4 tons per year	Fugitive emissions +VOC emissions after control 351.8 tons per year + 2.56 tons per year

Approximately 99.3% (351.8 tons per year) of the VOC were assumed to be lost via fugitive emission sources and 0.7% (2.56 tons per year) were assumed emitted from the process vents after controls.

3.0 Project Regulatory Review

3.1 Regulations

The new SDE-2 operations will be subject to the following regulations.

- 15A NCAC 2D .0530, Prevention of Significant Deterioration – Because the facility is located in Bertie County, which is attainment for all NAAQS pollutants, the planned modification and its emissions are required to be assessed in light of PSD requirements. Avoca is a major stationary source for PSD purposes, and the emission increases as a result of this modification exceed the significance levels as listed in 40 CFR 51.166(b)(23)(i). Thus, the new SDE-2 operations are subject to BACT. As discussed in greater detail in Section 4, the BACT limit for the SDE-2 operations is 354.4 tons per year (tpy) of VOC (12-month running total).

- 15A NCAC 2D .0958, Work Practices for Sources of Volatile Organic Compounds – This regulation establishes work practice standards for sources that emit VOC. Because VOC are being used as a material processing media, the regulation is applicable to this facility.

- 15A NCAC 2D .1111, Maximum Achievable Control Technology – Avoca is a major source of hazardous air pollutants (HAPs), and the new SDE-2 operations uses n-hexane, which is a HAP. As specified in 40 CFR 63.2435(b)(2), facilities that are major for HAPs with miscellaneous chemical process units (MCPU) that process, use or generate organic HAPs are subject to "NESHAP for Miscellaneous Organic Chemical Manufacturing," 40 CFR Part 63, Subpart FFFF, also referred to the "Miscellaneous Organic NESHAP" or MON. More discussion of MACT is contained in Section 3.2 below.

- 15A NCAC 2D .1806, Control and Prohibition of Odorous Emissions – This rule is state enforceable only and is applicable facility-wide. Under this regulation, no facility shall operate

without employing suitable measures for the control of odorous emissions. There is no history of odor complaints from the existing operations.

3.2 Miscellaneous Organic NESHAP

The existing SDE-1 operations and new SDE-2 operations at Avoca are subject to the MON. These operations are considered the same MCPU based on the "family of materials" defined in the MON. The new SDE-2 operations will be three times larger than the current SDE-1 operations, and the cost of this addition will exceed 50 percent of the fixed capital cost required to construct a comparable new source. The modified MCPU meets the definition of reconstruction under 40 CFR 63.2. As such, both SDE-1 operations and SDE-2 operations are considered new affected sources under 40 CFR 63.2440(c).

The batch vents, storage tanks, and wastewater operations in the SDE-1 process are currently classified as Group 2 sources. These designations will not change under this modification, and the SDE-1 process will continue to meet Group 2 requirements.

The batch process vents and the virgin hexane tank (ID No. T-4001) in the new SDE-2 operations are classified as Group 1 sources. The wastewater operations and other tanks in the new SDE-2 operations are classified as Group 2 sources. Emission limits and compliance options for the new SDE-2 operations under the MON are summarized in the table below.[2] The SDE-2 operations must be in compliance with the MON upon startup.

Emission Unit	**Emission Limit/Work Practice Standard**	**How to comply**
Batch Process Vents	Table 2, Option (b) for batch vents: Avoca will reduce collective uncontrolled organic HAP emissions from the sum of all batch process vents within the process by ≥95 percent by weight by venting emissions from a sufficient number of the vents through a closed-vent system to a combination of recovery devices (e.g., a condenser and a mineral oil scrubber).	Avoca will meet the applicable requirements in 40 CFR 63.2460 including the following: • Demonstrate initial compliance and establish operating limits via source tests. • Conduct testing under worst case conditions. • Use daily averaging. • Install a flow meter on the control device. Periods of no flow will not be used in the daily averages.
Storage Tanks	Virgin hexane tank (ID No. T-4001) 17,900 gallons (67.8 m^3) with a vapor pressure of 13.6 kPa Table 4, option (b)(ii) Avoca will reduce collective uncontrolled organic HAP emissions from the sum of all batch process vents within the process by ≥95 percent by weight by venting emissions from a sufficient number of the vents through a closed-vent system to a combination of recovery devices (e.g., a condenser and a mineral oil scrubber).	Virgin hexane tank (ID No. T-4001) The subject tank will be vented to condenser and MOS, and will meet the requirements under 40 CFR 63.2450(c) for combined emission streams. Specfically under 40 CFR 63.2450(c)(2)(i), emissions from the tank must meet the requirements of Table 2 and 40 CFR 63.2460 for Group 1 batch process vents, including applicable monitoring, recordkeeping, and reporting.

[2] The MON allows subject facility several options for compliance. Avoca intends to comply with the options as specified in the table.

Emission Unit	Emission Limit/Work Practice Standard	How to comply
Storage Tanks	Other tanks in the SDE-2 operations	Other tanks in the SDE-2 operations All other tanks are less than 10,000 gallons and do not meet the Group 1 status. As such they are Group 2 storage tanks and have no control requirements under the MON. Although not required by the MON, Avoca has elected to vent all storage tanks in the SDE-2 to the condenser and MOS.
Equipment Leaks	Table 6 for any MCPU	Avoca will comply with requirements of 40 CFR Part 63, Subpart UU.
Wastewater in SDE-2	Table 7	Process Wastewater streams Avoca has determined the concentration of n-hexane in the wastewater streams to be less than 15 ppm for n-hexane, making them Group 2 wastewater streams. The only requirements for Group 2 process wastewater streams is recordkeeping and reporting. Maintenance Wastewater streams Avoca will develop required maintenance procedures for these streams and incorporate the procedures into the facility's startup, shutdown, and malfunction plan. Liquid streams in an open system within an MCPU Avoca does not have equipment in Table 35 of 40 CFR Part 60 Subpart G that meets the requirements of 40 CFR 63.149(e)(1) or (2). Therefore the liquid streams in the SDE operations require no controls.
Heat exchangers	Table 10	Avoca will comply with requirements under 40 CFR 63.104 as applicable. Specifically, Avoca is currently complying with 40 CFR 63.104(b) and will continue to do so for the new SDE-2 operations.

Avoca will meet the monitoring, reporting, and recordkeeping requirements for the SDE-2 operations as discussed in detail in the permit application. The permit application serves as both the precompliance report under 40 CFR 63.2520(c), which must be submitted with the application for approval of construction, and the initial notification, as allowed under 40 CFR 63.9(b)(1)(iii).

Section 2.2.C.1 of the permit contains the MON requirements. This permit condition will be updated to include the SDE-2 operations. The equation for calculating organic HAP emissions from the SDE-1 operations to maintain its vents as Group 2 batch process vents under the MON was also updated. One other change to note is the removal of requirements for Group 2 batch process vents that emit hydrogen halides. Avoca does not emit any hydrogen halides, and this requirement is not applicable to the facility. The revised permit condition is provided in Attachment 1 of this permit review.

4.0 Prevention of Significant Deterioration

The basic goal of the PSD regulations is to ensure the air quality in clean (i.e. attainment) areas does not significantly deteriorate while maintaining a margin for future industrial growth. The PSD regulations focus on industrial facilities, both new and modified, that create large increases in the emission of certain pollutants. The EPA promulgated final regulations governing the PSD in the Federal Register published August 7, 1980. Effective March 25, 1982, the NCDAQ received full authority from the EPA to implement PSD regulations in the state.

4.1 PSD Applicability

Under PSD requirements all major new or modified stationary sources of air pollutants regulated and listed in this section of the Clean Air Act must be reviewed and approved prior to construction by the permitting authority. A major stationary source is defined as any one of 28 named source categories that has the potential to emit 100 tons per year of any regulated pollutant or any other stationary source that has the potential to emit 250 tons per year of any PSD regulated pollutant. Avoca is a chemical processing plant, which is one of the 28 listed source categories with major source thresholds of 100 tons per consecutive 12-month period, under 40 CFR 51.166 (b)(1)(i)(a). It is a major stationary source for PSD purposes. Therefore, the emission increases as a result of this modification must be compared to the significance levels as listed in 40 CFR 51.166 (b)(23)(i) to determine which pollutants must undergo a PSD review.

For this proposed modification, emissions of VOC exceed the SER of 40 tons per year. Other PSD regulated pollutants are not emitted as part of this modification. Thus, Avoca performed the following reviews and analysis related to PSD for VOC for this modification:

- A BACT determination, and
- An additional impacts analysis including effects on soils, vegetation, and visibility.

4.2 BACT Analysis

Under PSD regulations, the determination of the necessary emission control equipment is developed through a BACT review. BACT is defined, in pertinent part, by the Federal Register [40 CFR 51.166 (b)(12)] as:

> *An emissions limitation... based on the maximum degree of reduction for each pollutant... which would be emitted from any proposed major stationary source or major modification which the reviewing authority, on a case-by-case basis, taking into account energy, environment, and economic impacts and other costs, determines is achievable... for control of such a pollutant.*

The BACT requirements are intended to ensure that the control systems incorporated in the design of the proposed facility reflect the latest control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the facility. Additionally, the BACT analysis may consider the impacts of non-criteria pollutants and unregulated toxic air pollutants, if any are emitted, when making the BACT decision for regulated pollutants. The pollutant subject to PSD review for the new SDE-2 operations at Avoca is VOC.

Each pollutant subject to a PSD review must meet the criteria of BACT, which refers to the maximum amount of emission reduction currently possible with respect to technical application and

economic, energy, and environmental considerations. Because equipment within categories of sources vary widely, it is difficult to establish a uniform BACT determination for a particular pollutant or source. Economics, energy, and environment in combination with the unique functions of the source and engineering design, require BACT to be determined on a case-by-case basis. In most instances BACT may be defined through an emission limitation. In cases where this is impossible, BACT can be defined by the use of a particular type of control device and its achievable emission reduction efficiency. In no event can a technology be recommended that would not comply with any applicable standard of performance established pursuant to section 111 or 112 of the Clean Air Act.

The BACT analysis performed for Avoca included five basic steps listed below:
1) Identify all control technologies,
2) Eliminate technically infeasible options,
3) Rank remaining control technologies by control efficiencies,
4) Evaluate the most effective controls and document results, and
5) Select BACT.

The first step in this approach is a comprehensive listing of control technologies for each applicable pollutant. Step two is a demonstration of technical feasibility to ensure the technology evaluated was appropriate for the characteristic gas stream to be treated. Step three ranks the remaining control technologies by control effectiveness, including the control efficiencies (percent of pollutant removed), expected emission rate (tons per year and pounds per hour), expected emission reduction (tons per year), economic impacts (cost effectiveness), environmental impacts (including emission of toxic or hazardous air contaminants), and energy impacts (benefits or disadvantages). Step four is a case-by-case evaluation of energy, environmental, and economic impacts. Step five requires the selection of BACT for the emission source. While the steps are similar to EPA's top-down process, unlike the EPA decision process, NCDAQ follows statutory mandate that economics, energy, and environmental impacts of candidate technologies be evaluated.

4.3. BACT Analysis for SDE Process Vents

4.3.1 Identify Control Technologies

An investigation was performed to identify current regulatory BACT/LAER determinations for extraction operations. The search involved a review of EPA's RACT/BACT/LAER clearinghouse (RBLC), which included information on BACT and LAER decisions throughout the country. The search focused on several similar operations with BACT determinations with in the last ten years. The following emission source categories in the RBLC were searched:

- Other Agricultural Manufacturing Sources (RBLC Code 61.999)
- Batch Reaction Vessels (RBLC Code 64.001)
- Process Vents (RBLC Code 64.003)
- Storage Tanks (RBLC Code 64.004)
- Other (RBLC Code 64.999)
- Other Chemical Manufacturing (RBLC Code 69.999)
- Food and Agricultural Production (RBLC Code 70.390)
- VOC with process containing "extraction."

The review of NSR permit data in the RBLC identified 55 decisions involving facilities meeting the search criteria noted previously. The primary types of controls identified as BACT in the RBLC search were mineral oil scrubbers, alone or with condensers (12); scrubbers or absorption, but not specifically mineral oil scrubbers, alone or with condensers (15); emission limits (10), and condensers alone (5). Carbon adsorption was identified as control in one draft decision in the RBLC results. Five decisions cited leak detection and repair (LDAR) as BACT for process leak. Three decisions were for nitrogen blankets (2) and a floating roof (1) on storage tanks. Four decisions involved fixed roofs for wastewater operations, one of which included a biological treatment system. Also, note that not all these controls were installed as a result of BACT or LAER requirements.

Based on an extensive search of RBLC results, as well as a review of relevant literature and knowledge of controls for similar industries, the following control technologies were considered in this BACT analysis for VOC control:

- Thermal Oxidation Systems
- Catalytic Oxidation Systems
- Adsorption Systems
- Absorption Systems
- Biofiltration Systems
- Condensation Systems.

4.3.2 Eliminate Technically Infeasible Options

Catalytic Oxidation/Thermal Catalytic Oxidation

In a catalytic oxidizer, a catalyst is used to lower the activation energy needed for oxidation. When a preheated gas stream is passed through a catalytic oxidizer, the catalyst bed initiates and promotes the oxidation of VOC without being permanently altered. In catalytic oxidization, combustion occurs at significantly lower temperatures than with thermal oxidization. However, care must be taken to ensure complete combustion.

A major disadvantage of catalytic oxidization is the high cost of fuel and catalyst replacement. Although catalytic oxidization requires less fuel than thermal oxidization at the same heat recovery rate, the catalyst replacement costs can be significant. In some cases, disposal of spent catalyst can also prove a difficult hurdle because of deposits of potentially hazardous substances.

Catalytic oxidation is not considered to be technically feasible in this situation. The SDE operations may contain chemical compounds that could poison/blind the catalyst. None of the process in the RBLC used this control technology.

Carbon Adsorption

Adsorption is a process where VOCs are removed from low to medium concentration gas streams. The gas molecules pass through a bed of solid particles such as activated carbon, which is the most widely used adsorbent. The molecules are held to the adsorbent by attractive forces that are weaker than chemical bonds.

One draft decision in the RBLC identified carbon adsorption as control on an extraction process. As shown in the results of the RBLC search, the extraction industry primarily uses condensers and mineral oil scrubbers as BACT. Carbon adsorption has been eliminated as a technology that has not been demonstrated in practice in the biological extraction industry.

Bio-oxidation / Biofiltration

Bio-filtration is an air pollution control technology in which VOCs are oxidized using living micro-organisms on a media bed (sometimes referred to as a bioreactor). As emissions flow through the bed media, pollutants are absorbed by moisture on the media and come into contact with the microbes. The microbes consume and metabolize the excess organic pollutants, converting them to carbon dioxide and water, much like a traditional oxidation process.

The efficacy of bio-oxidation and biofiltration to remove VOC emissions from the Avoca facility is unknown. A review of the RBLC search confirms no extraction processes using this control technology as BACT. Due to the undemonstrated nature of bio-oxidation/biofiltration in the biologic extraction industry, this technology has been eliminated from further consideration.

4.3.3 Rank Remaining Control Technologies by Effectiveness

The remaining control technologies were ranked from the most stringent to the least stringent, as shown in the table below.

Control Technology	Approximate Control Efficiency (%)
Regenerative Thermal Oxidation (RTO) + Condenser	98%
Mineral Oil Scrubber (Packed bed absorption) + condenser	98%
Condenser	65%

Thermal Oxidation (Regenerative)

In regenerative oxidation, the inlet gas stream is drawn through a hot ceramic or stoneware bed that preheats the gas stream prior to its entering the combustion chamber. The hot flue gas exits the oxidizer and passes into a second ceramic bed, which captures and stores thermal energy. When this bed has been heated sufficiently, the flow is switched so that the inlet gas is now redirected through the hot bed and the exhaust gas is passed through the now cool primary bed. By switching flows in this manner, high heat exchanger temperatures are maintained. Aside from the ceramic media heat exchanger, regenerative systems operate in the same manner as conventional thermal oxidization.

Regenerative oxidizers provide a high degree of thermal heat recovery and are useful for situations where the air flowrate is high and VOC concentration is low. In these cases, a significant amount of heat recovery is required to minimize overall system operating costs. Costs can be high because of the capital investments, and supplemental fuel along with other operating costs.

Mineral Oil Scrubber (Absorption)

Absorption systems, like the mineral oil scrubber, are used to control gas-phase VOC. The effectiveness of the absorption system will depend on the solubility of the pollutant in the liquid stream, the gas and liquid throughput rates, and the type of scrubber that is selected. The typical scrubber used for this type of operation is a mineral oil scrubber, as was confirmed by the search of the RBLC for extraction processes.

Condensers

Condensers operate by separating volatile compounds in a vapor mixture from the remaining vapors by means of saturation followed by a phase change. Condensers are typically refrigerated to decrease the temperature to aid in saturation and therefore increase the removal efficiencies of the units. There are two common types of condensers used for VOC removal – surface and contact condensers. The coolant does not contact the gas stream in surface condensation; the vapor condenses as a film on the cooled surface and then discharges to a collection tank. Conversely, the vapor stream is sprayed with a liquid coolant in a contact condenser. The VOCs contained within the waste coolant often create a disposal problem because they cannot be recycled or separated from the stream without additional processing.

Because the condenser's removal efficiency is highly dependent on the characteristics of the waste gas stream, they are only feasible for removing certain compounds. Compounds with high boiling points and low volatility are more easily condensable than compounds with low boiling points and high volatility. EPA recommends, as a conservative starting point for considering condensers as a control, that the VOCs have boiling points above 100° F. N-hexane and isohexane have boiling points of 156°F and 140°F, respectively. Thus, condensers are technically feasible as a control option for the SDE-2 operations.

4.3.4 Evaluate Technically Feasible Control Options

A BACT analysis, consistent with the Clean Air Act, was performed on the add-on control technologies that were shown to be technically feasible.

Assumptions Used in the BACT analysis

To perform the BACT analysis, it was necessary to make engineering judgments concerning the control efficiency of various add-on controls. The destruction efficiency of the RTO and condenser was estimated as 98%. The removal efficiencies of the mineral oil scrubber and condenser and the condenser alone were estimated as 98% and 65%, respectively.

Other assumptions used in performing this analysis are included in the detailed cost calculations presented in Appendix D of the permit application. All cost estimates were prepared using potential VOC emission rates for the new SDE-2 operations. Annual operational hours were assumed to be 8,760 per year.

Cost Effectiveness

The cost impacts of controlling equipment emissions with add-on controls are presented in the table below. The estimated cost impacts were estimated using the Office of Air Quality Planning and Standards Control Cost Manual (CCM)[3] , past permitting experience, EPA Technology Fact Sheet for packed bed scrubbers, and vender quotes for the condenser. All costs provided in the CCM were updated to 2014 dollars using Consumer Price Index Price Inflation calculator[4].

[3] Office of Air Quality Planning and Standards Cost Control Manual. Fourth Edition. EPA-450/3-90-006. Office of Air Quality Planning and Standards, Environmental Protection Agency, Research Triangle Park, North Carolina. January 1990.

[4] Consumer Price Index Calculator developed by the US Department of Labor Bureau of Labor Statistics.

Add-On Control Technology	Baseline Emissions (tons/yr)	VOC Emissions Reduction (%)	VOC Emissions Reduction (tpy)	Total Capital Cost (2014 $)	Total Annual Cost ($/yr)	Cost - Effectiveness ($/Ton)
RTO and condenser	51.1	98%	48.5	$620,162	$271,105	$5,585
Mineral Oil Scrubber and condenser	51.1	98%	48.5	$594,401	$230,533	$4,749
Condenser only	51.1	65%	33.2	$67,756	$156,502	$4,712

Notes:
Avoca would not install a mineral oil scrubber or RTO alone but would install a combination of condenser and mineral oil scrubber or RTO. The cost for the RTO and the mineral oil scrubber do not include the cost of the condenser. Even excluding the condenser, these control devices are not cost effective.

Energy and Environmental Impacts

Although each of the potentially feasible add-on control devices evaluated provides reductions in VOC emissions, the devices also have associated negative energy and/or environmental impacts. The energy and secondary environmental impacts are presented in the table below for each add-on control alternative. In the case of thermal oxidization, the combustion of natural gas would result in small quantities of combustion pollutants: nitrogen oxides (NO_x), sulfur oxides (SO_2), particulate matter (PM), carbon monoxide (CO), and VOCs. Emission factors from EPA's AP-42 document are used to calculate these emissions.

Control Technology	Emissions (tpy)					Energy Impacts
	NOx	SO2	PM	CO	VOC	Electricity Increase over Baseline (MW-hr/yr)
RTO and condenser	0.04	0.0003	0.003	0.04	0.002	0.683
Mineral Oil Scrubber and condenser	--	--	--	--	--	0.683
Condenser only	--	--	--	--	--	70.1

Notes:
- Emissions from the RTO were determined from DAQ's spreadsheet entitled, "Natural Gas Combustion Calculator Revision K" (06/19/2012), operating at 8,760 hours per year.
- EPA's AP-42, Section 1.4 (7/98).
- Natural gas requirements were based on vendor specifications.
- Natural gas fuel content was assumed to be 1,020 Btu/scfm.

4.3.5 Select BACT for Process Vents

The definition of BACT in the Clean Air Act (CAA) states, "In no event shall application of 'best available control technology'' result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to section 111 or 112 of this Act." (Section 169 of the CAA). Because 40 CFR Part 63 standards were established pursuant to 112(d) of the CAA, the emission reductions resulting from the MON must be accounted for in the proposed BACT limit. Otherwise, the proposed BACT limit conflicts with the definition of BACT under the CAA. BACT for the process vents are the post controlled VOC emissions of 2.56 tons per year, based on a 95% control efficiency required by the MON. Although not cost effective under the BACT analysis, a condenser and mineral oil scrubber will be installed on the new SDE-2 operations to comply with the MON requirements.

4.4 VOC BACT Analysis for Process Fugitives

Equipment leaks and other fugitive emissions from the SDE-2 operations are quantifiable based on a material balance of the solvents (n-hexane and isohexane) used in the process. The fugitive emissions occur at various locations or points (e.g., pumps, valves, flanges, opening reactors and dryers, etc.) throughout the new SDE-2 operation, and the facility indicates that these emissions cannot be easily controlled. The SDE-2 operations are subject to the Leak Detection and Repair (LDAR) requirements under the MON. Avoca will comply with 40 CFR Part 63, Subpart UU, as required for process fugitives under the MON.

4.5 Wastewater

In a 2004 PSD permit application, Avoca proposed BACT to be fixed roof tanks for the process wastewater tanks associated with the Rotocel, Recovery, Biomass Extraction, and Botanical Extraction operations. These same tanks will be used for SDE wastewater. Avoca will continue to comply with the 2004 BACT for wastewater tanks by using fixed roof tanks for all its wastewater operations.

4.6 Overall BACT Limit

Avoca is requesting a BACT limit for the SDE-2 operations of 354.4 tons per 12-month period. Because VOC emissions from the new SDE-2 operations are predominately fugitive emissions (99.3%), there is no practical approaches for setting a short term BACT limit. The most practical approach for assessing compliance is to continue to conduct a monthly solvent material balance to assess compliance with the BACT limit.

4.7. PSD Air Quality Impact Analysis

PSD regulations [40 CFR 51.166(k)] require an applicant to perform an ambient impact analysis to demonstrate, 1) that no NAAQS will be exceeded at any location and during any time period where the proposed new source or modification will have significant impact; and 2) that the proposed new source or modification, in combination with other increment-affecting sources, will not cause any allowable PSD increment to be exceeded. PSD regulation 40 CFR 51.166(m) requires analysis of ambient air quality in the impact area of the proposed source or modification for all pollutants (including those for which no NAAQS exist) with emissions increases in significant [40 CFR 51.166(b)(23)] quantities.

Potential Emissions

VOC emissions are considered precursors to ozone formation. PSD regulations [40 CFR 51.166(i)] state that an ambient impact analysis of ozone, including the gathering of ambient air quality data, could be required if the net VOC emission increase is greater than 100 tpy. Previous and ongoing regional air dispersion modeling efforts to determine ozone attainment within the North Carolina air shed have shown that VOC emissions at the level stated above will not contribute, by itself, to significant ozone formation. No additional monitoring or modeling is required for this pollutant.

Non-Regulated Pollutant Impact Analysis

The new SDE-2 operations, which are subject to 40 CFR Part 63, Subpart FFFF, as noted previously, emit the toxic air pollutants (TAPs), n-hexane and isohexane. As specified in 15A NCAC 2Q .0702(a)(27)(B), any air emission source subject to an applicable requirement under 40 CFR Part 63

is exempt from NC air toxics. However, the DAQ must ensure that the permit modification does not present "an unacceptable risk to human health," in accordance with G.S. 143-215. 107(b) as codified on May 1, 2014.

Avoca conducted its most recent air modeling in 2013 to remove requirements for NC Air toxics from the permit. The modeling analysis was reviewed by Tom Anderson of the Air Quality Analysis Branch of the NCDAQ. According to Mr. Anderson's memorandum dated May 16, 2013, the modeling demonstrated compliance on a source-by-source basis with the NC Acceptable Ambient Level (AAL) found in 15A NCAC 02D .1100.

To determine if the addition of the SDE-2 operations to the permit pose an unacceptable risk to human health, emissions of n-hexane and isohexane used in the 2013 air modeling were compared with potential emissions from this modification. The Rotocel/Recovery data used in previous modeling analyses was based on usage of 40% n-hexane and 60% isohexane. The facility no longer uses this mixture and now utilizes a 5% n-hexane and 95% isohexane. This change and decreased emissions from the recently modified SFG operations were included in the NC air toxics analysis for the SDE-2 operations. The results of the emission comparison are shown in the table below. The overall potential emissions of n-hexane decreased by 19.3% and emissions of isohexane emissions decreased by 2.4% when compared with the emissions used in the 2013 modeling. Therefore, the addition of the new SDE-2 operations does not present an unacceptable risk to human health.

Comparison of Facility-Wide Emissions

Pollutant	Averaging Period	Emissions Used in 2013 Air Modeling		Emissions after Modifications	
		Facility-wide emissions (lb/hr)	% of AAL	Facility-wide Emissions (lb/hr)	% Decrease in Emissions
n-hexane	24-hour	117.4	92%	94.7	19.3%
Isohexane	1-hour	1707.3	19%	1666.8	2.4%

Notes:

- Potential emissions of n-hexane from the new SDE-2 operations are estimated as 32.4 lb/hr, and potential emissions of isohexane were estimated as 48.5 lb/hr. The emissions take into account the control efficiency of the condenser and mineral oil scrubber used on process vents in the SDE-2 operations.
- Emissions of n-hexane from the SFG operations used in the 2013 modeling were 11.6 lb/hr. Emissions of isohexane were 421.5 lb/hr. Only heptane is now used in the SFG operations, and n-hexane and isohexane are no longer emitted from the SFG operations.
- For the existing Rotocel/Recovery Operations, emissions of n-hexane will decrease by 43.2 lb/hr due to a change in the n–hexane to isohexane ratio used in the Rotocel/Recovery operations. Emissions of isohexane will increase by 334.0 pounds/hr when compared to the emissions used in the 2013 air modeling.
- Emissions of n-hexane and isohexane from all other sources at Avoca remain the same as used in the 2013 modeling.

SER Analysis

As noted previously, VOC emissions from this project are above the SER for PSD. Potential emissions for all other PSD pollutants remain unchanged after the addition of the new SDE-2 operations and are therefore not subject to PSD review.

4.8. Additional Impact Analysis

PSD regulations [40 CFR 51.166(k)] also require a discussion of additional impacts and evaluation of potential impacts at Class I areas. The additional impact analysis generally has four parts as follows:

- Visibility impairment
- Growth
- Soils impacts, and
- Vegetation impacts.

Class I areas are federally protected areas for which more stringent air quality standards apply to protect unique natural, cultural, recreational, and/or historic values. The nearest Class I area is Swanquarter National Wilderness Area, which is located approximately 68 km southeast of the facility.

4.8.1 Visibility Impairment

Visibility impairment is primarily a function of PM and NOx emissions. Avoca is not subject to PSD review for any pollutants other than VOC, and emissions of PM and NOx are not changing as a result of the proposed modification. Because there are no significant increases of visibility-affecting pollutants, no analysis of visibility impairment is required for this project.

4.8.2 Growth Analysis

The growth analysis includes the projection of the associated industrial, commercial and residential source emissions that will occur in the area due to modification of the source. The evaluation looked at the local work force increase and assessed secondary emission sources that potentially will build in the area to support the Avoca facility.

Approximately 100 people are currently employed by the Avoca facility. Avoca does not anticipate that the number of employees will increase due to the proposed modification.

Employment for Bertie County was obtained from the NC Department of Commerce. The data indicates an average unemployment rate of 10.5% (1,008 people). If Avoca needs to increase employment due to this modification, workers are expected to come from the existing labor pool. No new support services or suppliers are expected to locate in the area as a result of this project. Thus, the impact of economic growth associated with the proposed project will be negligible.

4.8.3 Soils and Vegetation

The only potential impact on soils and vegetation resulting from the proposed project would be on long term damage associated with the elevated ozone levels. The effects of ozone on vegetation are well documented. Symptoms of ozone damage include reduction in growth rates, reduction in reproductive rates, direct foliar damage, and mortality.

VOCs are regulated because they can be a precursor to ozone formation. In addition to VOCs, an important component of ozone formation is the ambient concentration of NOx. Studies have shown that ozone formation in the southeast is NOx limited, meaning that ozone formation is limited by the amount of NOx in the atmosphere rather than the amount of VOCs. Because this project will increase the amount of VOCs emitted rather than NOx, it is unlikely to significantly impact the amount ozone formed and, consequently, it will not adversely affect vegetation in the surrounding area.

4.8.4 Class I Impact Analysis

PSD Class I impact analyses contain evaluations of Air Quality Related Values (AQRV) and PSD increment were applicable. AQRV are typically defined as visibility (both near-field plume impairment and/or regional haze) and acidic deposition. As previously discussed, there will be no signification increases of any visibility–affecting pollutants as a result of this modification. Thus, no visibility analysis is warranted. There are also no significant increases of any deposition-related pollutants (SO_2 or NO_X) expected as result of this modification. Therefore, no deposition analysis is required. Finally, there are no modeling related standards for VOCs (e.g. NAAQS or PSD increments). Therefore, no Class I or Class II area dispersion modeling analyses are required for this permit modification.

4.9 Public Participation Requirements

In accordance with 40 CFR 51.166(q), Public participation, the reviewing authority (NCDAQ) shall meet the following:

1) Make a preliminary determination whether construction should be approved, approved with conditions, or disapproved.

   This document satisfies this requirement providing a preliminary determination that construction should be approved consistent with the permit conditions described herein.

2) Make available in at least one location in each region in which the proposed source would be constructed a copy of all materials the applicant submitted, a copy of the preliminary determination, and a copy or summary of other materials, if any, considered in making the preliminary determination.

   This preliminary determination, application, and draft permit will be made available in the Washington Regional Office and in the Raleigh Central Office, with the addresses provided below.

Washington Regional Office	Raleigh Central Office
943 Washington Square Mall	217 West Jones Street
Washington, NC 27889	Raleigh, NC 27603

   In addition, the preliminary determination and draft permit will be made available on the NCDAQ public notice webpage.

3) Notify the public, by advertisement in a newspaper of general circulation in each region in which the proposed source would be constructed, of the application, the preliminary determination, the degree of increment consumption that is expected from the source or modification, and of the opportunity for comment at a public hearing as well as written public comment.

   The NCDAQ prepared a public notice (See Appendix A) that will be published in a newspaper of general circulation in the region.

4) Send a copy of the notice of public comment to the applicant, the Administrator and to officials and agencies having cognizance over the location where the proposed construction would occur as follows: Any other State or local air pollution control agencies, the chief executives of the city

and county where the source would be located; any comprehensive regional land use planning agency, and any State, Federal Land Manager, or Indian Governing body whose lands may be affected by emissions from the source or modification.

The NCDAQ will send the public notice (see Appendix A) to the Town Administrator of Windsor at PO Box 508, 106 Dundee Street Windsor, NC 27983 and the Bertie County Manager at PO Box 530, 106 Dundee Street, Windsor, NC 27983.

5) Provide opportunity for a public hearing for interested persons to appear and submit written or oral comments on the air quality impact of the source, alternatives to it, the control technology required, and other appropriate considerations.

The NCDAQ public notice (See Appendix A) provides contact information to allow interested persons to submit comments and/or request a public hearing.

5.0 Other Issues

5.1 Compliance

NCDAQ has reviewed the compliance status of this facility. The most recent inspection was completed during three site visits on December 3, 4, and 9, 2015. Betsy Huddleston of the WaRO indicated that the facility appeared to be in compliance with all applicable requirements. Additionally, a signed Title V Compliance Certification (Form E5) indicating that the facility was in compliance with all applicable requirements was included with the permit application, received on January 13, 2016. Avoca also submitted a revised Annual Compliance Certification (ACC) with minor administrative changes on February 29, 2016.

The following is the five-year compliance history for the facility.

- A Notice of Violation/Notice of Recommendation for Enforcement (NOV/NRE) was issued on October 31, 2012 for a failed particulate stack test. The biomass boilers had exceeded the particulate matter standard under 40 CFR Part 63, Subpart DDDDD. A civil penalty in the amount of $4,549, including costs, was issued on February 14, 2013. The civil penalty was paid in full on March 22, 2013.
- A Notice of Deficiency (NOD) was issued on March 5, 2014 because the downtime of the oxygen analyzer and steam meter on boilers (ID Nos. ES-BB1 and ES-BB2) exceeded the allowable thresholds established per requirements under 40 CFR 63, Subpart DDDDD.

Both NOV/NRE and NOD have been resolved.

5.2 Zoning Requirements

The area in which Avoca is located does not have zoning. As such, a notice was placed in the local paper and a sign has been placed in front of the facility as required pursuant to 15A NCAC 2Q .0113. The facility provided an affidavit and proof of publication of the legal notice as part of the permit application.

5.3 Professional Engineer's Seal

A Professional Engineer's seal was included with the application. Dana W. Norvell, a Professional Engineer, who is currently registered in the State of North Carolina, sealed the application for the portions containing the engineering plans, calculations, and all supporting documentation.

5.4 Application Fee

An application fee in the amount of $14,359.00 was received.

5.5 CAA Section 112(r)

The facility is not subject to Section 112(r) of the Clean Air Act requirements because it does not store any of the regulated substances in quantities above the thresholds in 112(r). This permit modification does not affect the 112(r) status of the facility.

6.0 Conclusion

Based on the application submitted and the review of this proposal by the NCDAQ, the NCDAQ is making a preliminary determination that the project can be approved and a revised permit issued. After consideration of all comments a final determination will be made.

C. Sclareolide (SDE-1) Operations, including:

- **Eleven (11) process tanks of various capacities (ID No. ES-1001-1-3-P);**
- **One centrifuge (ID No. G-17);**
- **One steam-heated dryer with process condenser (ID No. D-1202);**
- **Filters (ID No. ES-1001-1-3-Filters);**
- **SDE-1 process equipment leaks (ID No. ES-1001-3-F); and**
- **SDE-1 wastewater stream (ID No. ES-1001-1-3-WW)**

Sclareolide (SDE-2) Operations, including:

- **A chilled water condenser (ID No. CD-4002) in series with a mineral oil scrubber (ID No. CD-4003-S) controlling emissions from the following:**
  - **One 17,900 gallon virgin solvent tank (ID No. T-4001);**
  - **Two 6,000 gallon process tanks (ID Nos. T-4017 ant T-4018);**
  - **One 4,200 gallon reactor with process condenser (EX-4001) (ID No. R-4004);**
  - **One 4,200 gallon reactor with process condenser (EX-4002) (ID No. R-4005);**
  - **One 4,200 gallon reactor with process condenser (EX-4003) (ID No. R-4044);**
  - **One 1,500 gallon reactor (ID No. R-4015); and**
  - **One centrifuge (ID No. C-4001)**
- **One dryer with process condenser (EX-4004) (ID No. D-4001) associated with a control condenser (ID No. CD-4001), in series with a chilled water condenser (ID No. CD-4002) in series with a mineral oil scrubber (ID No. CD-4003-S);**
- **SDE-2 process equipment leaks (ID No. ES-4000-F); and**
- **SDE-2 process wastewater stream (ID No. ES-4000-WW)**

Ethyl Vanillin Glucoside (EVG) Operations, including:

- **One water spray fume scrubber (0.5 gallon per minute minimum water injection rate; ID No. CD-Z-9215) venting to one water spray fume scrubber (0.5 gallon per minute minimum water injection rate; ID No. CD-Z-9216) controlling emissions from the following:**
  - **Three reactors (ID Nos. D-2202, D-1215, and D-1218); and**
  - **One steam-heated dryer (ID No. D-1201);**
- **Process equipment leaks (ID No. ES-1003-2-2-F); and**
- **EVG Operations wastewater stream (ID No. ES-1003-2-2-WW)**

Plant Nutrient Extraction (PNE) Operations, including one water spray fume scrubber (0.5 gallon per minute minimum water injection rate; ID No. CD-Z-9215) venting to one water spray fume scrubber (0.5 gallon per minute minimum water solution injection rate; ID No. CD-Z-9216) controlling emissions from the following:

- **One product extract reactor (ID No. D31214) and one associated chilled water condenser (ID No. EX2203);**
- **Seven processing tanks of various capacities (ID No. ES-1003-2-1-P);**
- **One centrifuge (ID No. C-31203);**
- **One dryer equipped with a process condenser (ID No. D-1002);**
- **One process solvent tank (ID No. ES-TK-PNE-1)**
- **Process equipment leaks (ID No. ES-1003-2-1-F);**
- **One waste solids separator vessel (1,333 gallon capacity; ID No. D31211) and one associated chilled water condenser (ID No. EX2205); and**
- **PNE Process wastewater stream (ID No. ES-1003-2-1-WW)**

Concrete Operations, including:

- **Four steam-heated hot boxes (ID Nos. HB-1, HB-2, HB-3, and HB-4);**
- **Process equipment leaks (ID No. ES-1001-1-2-F);**
- **Six process tanks of various capacities (ID No. ES-1001-1-2-P) and one associated chilled water condenser (ID No. CD-1001-1-2); and**
- **Concrete Operations wastewater stream (ID No. ES-1001-1-2-WW)**

Rotocel Operations, as described in Section 2.1 C, above;
Two Storage and Recycle Tanks (ID No. ES-M-125A and M-125B)
Recovery Operations, as described in Section 2.1 C, above;
Biomass Extraction Operations, as described in Section 2.1 D, above;
Botanical Extraction Operations, as described in Section 2.1 D, above; and
Wastewater Treatment Plant Aeration Tank No. 1 (63,500 gallon capacity; ID No. WWTP-AT1)

The following table provides a summary of limits and standards for the emission source(s) describe above:

Regulated Pollutant	Limits/Standards	Applicable Regulation
Hazardous Air Pollutants (HAP)	Maximum Achievable Control Technology	15A NCAC 02D .1111 (40 CFR Part 63, Subpart FFFF)

1. 15A NCAC 02D .1111 "MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY"

   [40 CFR Part 63, Subpart FFFF]

   a. The Permittee shall comply with all applicable provisions, including the notification, testing, recordkeeping, monitoring, and reporting requirements contained in Environmental Management Commission Standard 15A NCAC 02D .1111 "Maximum Achievable Control Technology" as promulgated in 40 CFR Part 63, Subpart FFFF, "NESHAP for Miscellaneous Organic Chemical Manufacturing," including Subpart A "General Provisions."

   Definitions and Nomenclature [40 CFR 63.2550]

   b. For the purpose of this permit condition, the definitions and nomenclature contained in 40 CFR 63.2550 shall apply.

   40 CFR Part 63, Subpart A General Provisions [40 CFR 63.2540]

   c. The Permittee shall comply with the requirements of 40 CFR Part 63, Subpart A, "General Provisions," as specified in Table 12 to 40 CFR Part 63, Subpart FFFF.

   Compliance Date [40 CFR 63.2445(a), 40 CFR 63.56(b)]

   d. The Permittee shall be in compliance with the requirements of 40 CFR Part 63, Subpart FFFF for the SDE-2 operations upon startup. [40 CFR 63.2445(a)(2)]

   Notifications [40 CFR 63.2515, 40 CFR 63.2520]

   e. The Permittee shall submit a notification of intent to conduct a performance test at least 60 calendar days before the performance test is scheduled to begin as required in 40 CFR 63.7(b)(1). For any performance test required as part of the initial compliance procedures for batch process vents in Table 2 of 40 CFR Subpart FFFF, the Permittee shall also submit the test plan required by 40 CFR 63.7(c) and the emission profile with the notification of the performance test. [40 CFR 63.2515(c)]

f. The Permittee shall submit a Notification of Compliance Status (NOCS) Report for the SDE-2 operations no later than 150 days after startup. The NOCS must include the following information, as applicable:
   i. The results of any applicability determinations, emission calculations, or analyses used to identify and quantify HAP usage or HAP emissions from the affected source.
   ii. The results of emissions profiles, performance tests, engineering analyses, design evaluations, inspections and repairs, and calculations used to demonstrate initial compliance according to 40 CFR 63.2445 through 63.2485. For performance tests, results must include descriptions of sampling and analysis procedures and quality assurance procedures.
   iii. Descriptions of monitoring devices, monitoring frequencies, and the operating limits established during the initial compliance demonstrations, including data and calculations to support the established levels.
   iv. All operating scenarios.
   v. Descriptions of worst-case operating and/or testing conditions for control devices.
   vi. The information specified in 40 CFR 63.1039(a)(1) through (3) for each process subject to the work practice standards for equipment leaks in Table 6 to 40 CFR Part 63, Subpart FFFF.

   [40 CFR 63.985(c)(1), 40 CFR 63.2520(d)]

g. The Permittee must submit a NOCS Report for the Concrete Operations, the Biomass Extraction Operations, and/or the PNE Operations prior to the operation of those operations in organic HAP service (as defined at 40 CFR 63.2250) and such that provisions of 40 CFR Part 63, Subpart FFFF apply to those operations, pursuant to 40 CFR 63.2520(d). The NOCS must include the information referenced above in Section 2.2.C.1.f, as applicable.
h. The Permittee shall notify DAQ at least 60 days before operating Group 2 batch process vents as Group 1 batch process vents in accordance with 40 CFR 63.2460(b)(6)(ii) and 40 CFR 63.2520(e)(10)(ii).
i. The Permittee shall be deemed in noncompliance with 15A NCAC 02D .1111 if the notification requirements in Sections 2.2.C.1.e through h are not met.

General Compliance Requirements [40 CFR 63.2450, 40 CFR 63.2445]

j. The Permittee shall be in compliance with the emission limits and work practice standards in Tables 1 through 7 to 40 CFR Part 63, Subpart FFFF at all times, except during periods of startup, shutdown, and malfunction. [40 CFR 63.2450(a)]
k. The Permittee shall comply with the applicable control requirements found in 40 CFR 63.2455 through 63.2490 for the affected sources. [40 CFR 63.2450(a)]
l. Opening a safety device, as defined in 63.2550, is allowed at any time conditions require it to avoid unsafe conditions. [40 CFR 63.2450(p)]
m. If a Group 2 emission point becomes a Group 1 emission point, the Permittee shall be in compliance with the Group 1 requirements beginning on the date the switch occurs. An initial compliance demonstration as specified in 40 CFR Part 63, Subpart FFFF must be conducted within 150 days after the switch in group status occurs. [40 CFR 63.2445(d)]
n. The Permittee shall develop a written startup, shutdown, and malfunction plan (SSM Plan) that complies with 40 CFR 63.6(e) for the affected sources. The Permittee is not, however, required to address equipment leaks (except for control devices) or Group 2 emission points in the SSM Plan. The SSM Plan must describe, in detail, procedures for operating and maintaining the affected sources during periods of startup, shutdown, and malfunction; and corrective actions for malfunctioning process, control, and monitoring equipment used to comply with Subpart FFFF. The SSM Plan does not need to address any scenario that would not cause an affected source to exceed an applicable emission limit in Subpart FFFF. The SSM Plan must be maintained on site and made available for inspection by authorized personnel. [40 CFR 63.6(e)(3) and 63.2525(j)]
o. The Permittee shall be deemed in non-compliance with 15A NCAC 02D .1111 if the requirements in Sections 2.2 C.1.j through n, above are not met.

Emission Limits [15A NCAC 02Q .0508(f), 40 CFR 63.2450, 40 CFR 63.2460, Table 2]

p. The Permittee has elected to combine organic HAP emissions from different emission types in the SDE-2 operations (e.g., storage tanks and batch process vents). In accordance with 40 CFR 63.2450(c)(2)(i), the Permittee shall comply with the requirements for Group 1 batch process vents in Table 2 of 40 CFR Part 63, Subpart FFFF and 40 CFR 63.2460 for the combined streams, including applicable monitoring, recordkeeping, and reporting.

q. In accordance with Table 2 of 40 CFR Part 63, Subpart FFFF, the Permittee shall reduce collective uncontrolled organic HAP emissions from the sum of all vents within SDE-2 operations by ≥95 percent by weight by venting emissions from a sufficient number of the vents through one or more closed-vent systems to the chilled water condenser **(ID No. CD-4002)** in series with the mineral oil scrubber **(ID No. CD-4003-S)** (recovery devices as defined in 40 CFR 63.2550(i)). [40 CFR 63.2450(c)(2)(i), 40 CFR 63.2460(a), Table 2 (1)(a) in 40 CFR Part 63, Subpart FFFF]

Testing [15A NCAC 02Q .0508(f), 40 CFR 63.2460]

r. The Permittee shall conducted a performance test to demonstrate initial compliance with the emission limit in Section 2.2.C.1.q within 150 days of initial startup of the SDE-2 operations. The Permittee shall conduct the testing under worst-case conditions. The testing shall be performed in accordance with 40 CFR 63.2460(c)(2), 40 CFR 63.997,[1] 15A NCAC 02D .2601, and General Condition JJ. If the results of this test are above the emission limits as specified in Section 2.2.C.1.q above, the Permittee shall be deemed in noncompliance with 15A NCAC 02D .1111.

s. The Permittee shall establish operating limits for the chilled water condenser **(ID No. CD-4002)** in series with the mineral oil scrubber **(ID No. CD-4003-S)** in accordance with 40 CFR 63.2460(c)(3) within 150 days of initial startup of the SDE-2 operations. The operating limits shall be established under the conditions required for the initial compliance demonstration. If the Permittee fails to establish operating limits in accordance with these requirements, the Permittee shall be deemed in noncompliance with 15A NCAC 02D .1111.

Monitoring Requirements [15A NCAC 02Q .0508(f), 40 CFR 63.2460]

t The Permittee shall comply with the specific requirements of Sections 2.2 C.1.t.i through vii, below:

i. **Continuous process vents:** To ensure compliance, the Permittee shall perform the monitoring of Sections 2.2 C.1. t.i(A) and (B), below, for the affected continuous process vents:

(A) For the continuous process vents associated with the Rotocel Operations and the Recovery Operations, the Permittee shall perform the monitoring found in Sections 2.2 B.1.g through j, above.

(B) For continuous process vent associated with the Botanical Extraction Operations, the Permittee shall perform the monitoring found in Sections 2.2 B.1.g and h, above.

ii. **Group 1 batch process vents**: To ensure compliance, the Permittee shall perform the following monitoring for the process vents and storage tanks (i.e., combined process streams) in the SDE-2 operations:

(A) The Permittee shall monitor the mineral oil scrubber temperature and specific gravity of the mineral oil. Each monitoring device shall be capable of providing a continuous record. [40 CFR 63.990(c)(1)]

(B) The Permittee shall monitor the condenser exit temperature using a monitoring device capable of providing a continuous record. [40 CFR 63.990(c)(2)]

(C) Because flow to the chilled water condenser **(ID No. CD-4002)** in series with the mineral oil scrubber **(ID No. CD-4003-S)** could be intermittent, the Permittee shall install, calibrate, and operate a flow indicator at the inlet or outlet of the control device to identify periods of no flow. Periods of no flow may not be used in daily averages or in fulfilling a minimum data availability requirement [40 CFR 63.2460(c)(7)]

1 With the exceptions specified in 40 CFR 63.2450(g)(1)-(5).

(D) Upon DAQ's approval of the operating limits for the chilled water condenser **(ID No. CD-4002)** and mineral oil scrubber **(ID No. CD-4003-S)**, the Permittee shall attach the approval memorandum to this permit and shall maintain the parameters within the associated operating limits contained therein.

iii. **Group 2 batch process vents:** To ensure compliance, the Permittee shall perform the monitoring of Sections 2.2 C.1.t.iii(A) and (B), below, for the affected batch process vents:

(A) For the batch process vents associated the EVG Operations and SDE-1 operations, the Permittee shall comply with the requirements of 40 CFR 63.2460. To maintain Group 2 classification for these emission sources, the organic HAP emissions must be less than 10,000 pounds per consecutive 365-day period, each source. The Permittee shall monitor the organic HAP emissions from each of these emission sources, monthly, as follows:

(1) Organic HAP emissions from the EVG Operations shall calculated using the following equation:

$$OrganicHAP = \left[1.0\left(\frac{pounds}{batch} \right) \times B \right]$$

Where: B = The number of batches processed in the EVG Operations

(2) Organic HAP emissions from the SDE-1 operations shall calculated using the following equation:

$$OrganicHAP = \left[2.27\left(\frac{pounds}{\tan kfill} \right) \times Btf \right] + \left[4.80\left(\frac{pounds}{batch} \right) \times B_{reg} \right] + \left[3.66\left(\frac{pounds}{batch} \right) \times B_{rec} \right] + \left[4.19\left(\frac{pounds}{batch} \right) \times B_{tc} \right]$$

Where: B_{reg} = The number of regular batches processed in the SDE-1 Operations; and

B_{rec} = The number of recrop batches processed in the SDE-1 Operations

Btc = The number of third crop batches processed in the SDE-1 Operations; and

Btf = The number of hexane tank (M-2) fills.

(B) Upon DAQ's approval of revised organic HAP emission factors cited in the equations in Sections 2.2 C.1.t.iii(A)(1) and (2), above, the Permittee shall attach the approval memorandum to this permit and shall use the revised emission factors in calculating the organic HAP emissions from the EVG Operations and the SDE-1 Operations.

iv. **Storage tanks (except those associated with the SDE-2 operations):** For the storage tanks that are part of the affected source, the Permittee shall comply with the requirements of 40 CFR 63.2470 and Table 4 of 40 CFR Part 63, Subpart FFFF.

v. **Equipment leaks:** For the process equipment leaks from the affected sources, the Permittee shall comply with the requirements of 40 CFR 63.2480 and Table 6 of 40 CFR Part 63, Subpart FFFF. The Permittee shall comply with the monitoring requirements of the leak detection and repair (LDAR) program found in Section 2.2 B.2, above, for the equipment associated with the affected sources.

vi. **Wastewater streams:** For the wastewater streams associated with the affected miscellaneous organic chemical manufacturing processes (MCPU), the Permittee shall comply with the requirements of 40 CFR 63.2485 and Table 7 of 40 CFR Part 63, Subpart FFFF, including:

(A) Identifying any operations that may generate maintenance wastewater and the procedures for properly managing that maintenance wastewater in the SSM Plan developed for this Avoca, Inc. facility [40 CFR 63.105]; and

(B) Maintaining the conditions necessary for classification of the process wastewater from the affected sources as Group 2, unless the conditions of Section 2.2 C.1.m, above, have been met.

vii. **Heat exchangers:** For the heat exchangers associated with the affected sources, the Permittee

shall comply with the requirements of 40 CFR 63.2490 and Table 10 of Subpart FFFF, including:

(A) Preparation and implementation of a monitoring plan that documents the procedures that will be used to detect leaks of process fluids into cooling water. This plan shall require monitoring of one or more surrogate indicators (e.g., pH, conductivity, etc.) or monitoring of one or more process parameters or other conditions that indicate a leak. The plan shall include the following:

(1) A description of the parameter or condition to be monitored and an explanation of how the selected parameter or condition will reliably indicate the presence of a leak;

(2) The parameter level(s) or conditions(s) that shall constitute a leak. This shall be documented by data or calculations showing that the selected levels or conditions will reliably identify leaks. The monitoring must be sufficiently sensitive to determine the range of parameter levels or conditions when the system is not leaking. When the selected parameter level or condition is outside that range, a leak is indicated;

(3) The monitoring frequency which shall be no less frequent than monthly for the first 6 months and quarterly thereafter to detect leaks;

(4) The records that will be maintained to document compliance with the requirements of 40 CFR 63.104.

(B) If a substantial leak is identified by methods other than those described in the heat exchanger monitoring plan and the method(s) specified in the plan could not detect the leak, the Permittee shall revise the plan and document the basis for the changes no later than 180 days after discovery of the leak.

(C) The Permittee shall maintain a copy of the heat exchanger monitoring plan on-site. If the monitoring plan is superseded, retain the most recent superseded plan at least until 5 years from the date of its creation.

(D) If a leak is detected in any heat exchanger system, it shall be repaired as soon as practical but not later than 45 calendar days after the Permittee receives results of monitoring tests indicating a leak, unless the Permittee demonstrates that the results are due to a condition other than a leak. Once the leak has been repaired, the owner or operator shall confirm that the heat exchange system has been repaired within 7 calendar days of the repair or startup, whichever is later, except where the Permittee appropriately applies the delay of repair provisions found in Section 2.2 C.1.t.vii.(E), below.

(E) Delay of repair of heat exchange systems is allowed if the equipment is isolated from the process. Delay of repair is also allowed if repair is technically infeasible without a shutdown and any one of the conditions listed in 40 CFR 63.104(e)(1) through (2) is met.

[40 CFR 63.2490, 40 CFR 63.104]

The Permittee shall be deemed in non-compliance with 15A NCAC 02D .1111 if the Permittee does not meet the requirements of Sections 2.2 C.1.t.i through vii, above.

Recordkeeping Requirements [15A NCAC 02Q .0508(f)]

u. The Permittee shall comply with the following requirements:

i. Create and retain a record of each time a safety device is opened to avoid unsafe conditions.

ii. Create and retain the following records on each affected MCPU:

(A) A description of the process and the type of process equipment used;

(B) An identification of related process vents (including associated emissions episodes), wastewater points of determination (PODs), and storage tanks;

(C) The applicable control requirements pursuant to 40 CFR Part 63, Subpart FFFF, including the level of required control, and for vents, the level of control for each vent;

(D) The control device or treatment process used, as applicable, including a description of operating and/or testing conditions for any associated control device;

(E) The process vents, wastewater POD, transfer racks, and storage tanks (including those from

other processes) that are simultaneously routed to the control device or treatment process;
(F) The applicable monitoring requirements of this subpart and any parametric level that assures compliance for all emissions routed to the control device or treatment process; and,
(G) Calculations and engineering analyses required to demonstrate compliance.
[40 CFR 63.2525(b)]

iii. Create and retain a schedule or log of operating scenarios for the batch operations updated each time a different operating scenario is put into effect. [40 CFR 63.2525(c)]

iv. For each affected MPCU with a Group 1 batch process vent (i.e., combined process streams in the SDE-2 Operations), the Permittee shall keep records of daily averages of each continuously monitored parameter specified in Section 2.2.C.1.t.ii, above. The Permittee shall calculate and/or maintain records of the following:
(A) The Permittee shall maintain records of values as specified in 40 CFR 63.998(b)(1);
(B) Except as specified in Section 2.2.C.1.u.iv.(E) below, daily average values of each continuously monitored parameter shall be calculated from data meeting the specifications of 40 CFR 63.998(b)(2) for each operating day and retained for 5 years.
(C) The daily averages shall be calculated as the average of all values for a monitored parameter recorded during the operating day. The average shall cover a 24-hour period if operation is continuous, or the period of operation per operating day if operation is not continuous. If values are measured more frequently than once per minute, a single value for each minute may be used to calculate the daily average instead of all measured values. [40 CFR 63 63.998(b)(3)]
(D) Periods of no flow may not be used in daily averages, and they may not be used in fulfilling a minimum data availability requirement. [40 CFR 63.2460(c)(7)]
(E) The Permittee shall not exclude monitoring data during periods of startup, shutdown, and malfunction. [40 CFR 63.2450(l)]
(F) Actual concentration for supplemental gases must be corrected using Equation 1 of 40 CFR Part 63, Subpart FFFF. [40 CFR 63.2460(c)(6)]
(G) The operating day shall be the period defined in the operating permit or in the NOCS. It may be from midnight to midnight or another daily period. [40 CFR 63.988(b)(3)]
(H) If all recorded values for a monitored parameter during an operating day are within the limits established in the NOCS or in the operating permit, the Permittee may record that all values were within the range and retain this record for 5 years rather than calculating and recording a daily average. [40 CFR 63 63.998(b)(3)]
(I) The Permittee shall maintain records of the results of each continuous parameter monitoring system calibration check and the maintenance performed, as specified in 40 CFR 63.2450(k)(1).
[40 CFR 63.2450, 40 CFR 63.2525, 40 CFR 63.998(b)(1) through (3)]

v. For each affected MPCU with a Group 2 batch process vent, the Permittee shall retain the following records:
(A) A record of the day each batch was completed;
(B) A record of whether each batch operated was considered a standard batch;
(C) The estimated uncontrolled and controlled emissions for each batch that is considered to be a non-standard batch; and
(D) Records of the daily 365-day rolling summations of emissions, or alternative records that correlate to the emissions (e.g., number of batches), calculated no less frequently than monthly.
[40 CFR 63.2525(e)]

vi. For the process equipment leaks from the affected sources, the Permittee shall retain each applicable record required by 40 CFR Part 63, Subpart UU. The Permittee shall comply with the recordkeeping requirements of the LDAR program found in Sections 2.2 B.2.ii. through jj, above, for the equipment associated with the affected sources. [40 CFR 63.2525(a)]

vii. For each affected Group 2 wastewater stream, the Permittee shall retain the following records:

(A) MPCU identification and description;
(B) Stream identification code;
(C) Concentration of compounds listed in Table 8 and Table 9 of 40 CFR Part 63, Subpart FFFF (in ppmw), including documentation of the methodology used to determine concentration; and,
(D) Stream flow rate (in liters/min).
[40 CFR 63.147(b)(8)]

viii. For each affected heat exchanger system, the Permittee shall retain the following records:
(A) Monitoring data indicating a leak, the date when the leak was detected, and if demonstrated not to be a leak, the basis for that determination;
(B) Records of any leaks detected by procedures other than those provided in the written heat exchanger monitoring plan, including the date the leak was discovered;
(C) The dates of efforts to repair leaks; and,
(D) The method or procedure used to confirm repair of a leak and the date repair was confirmed.
[40 CFR 63.104(f)(1)]

The Permittee shall be deemed in non-compliance with 15A NCAC 02D .1111 if the Permittee does not meet the requirements of Sections 2.2 C.1.u.i through viii, above.

Reporting [15A NCAC 02Q .0508(f), 40 CFR 63.2520]

v. Advanced Notification of a Process Change. The Permittee shall submit a report 60 days before the scheduled implementation date of any of the changes identified below:
i. Any change to the information contained in the precompliance report.
ii. A change in the status of a control device from small to large.
iii. A change from Group 2 to Group 1 for any emission point except for batch process vents batch process vents that meet the conditions specified in 40 CFR 63.2460(b)(6)(i).
[40 CFR 63.2520(e)(10)]

w. The Permittee shall submit a semiannual compliance report, acceptable to the Regional Air Quality Supervisor, of monitoring and recordkeeping activities postmarked or delivered on or before January 30 of each calendar year for the preceding six-month period between July and December, and July 30 of each calendar year for the preceding six-month period between January and June. The report shall contain the following:
i. Company name and address.
ii. Statement by a responsible official with that official's name, title, and signature, certifying the accuracy of the content of the report.
iii. Date of report and beginning and ending dates of the reporting period.
iv. If there are no deviations from any emission limit, operating limit or work practice standard specified in this subpart, include a statement that there were no deviations from the emission limits, operating limits, or work practice standards during the reporting period.
v. For each deviation from an emission limit, operating limit, and work practice standard, include the following information:
(A) The total operating time of the affected source during the reporting period; and,
(B) Information on the number, duration, and cause of deviations (including unknown cause, if applicable), as applicable, and the corrective action taken.
vi. Identification each new operating scenario which has been operated since the time period covered by the last compliance report and has not been submitted in the previous compliance report. For the purposes of this paragraph, a revised operating scenario for an existing process is considered to be a new operating scenario.
vii. For the equipment listed below, report in a summary format by equipment type, the number of components for which leaks were detected and for valves, pumps and connectors show the percent leakers, and the total number of components monitored. Also include the number of leaking components that were not repaired as required, and for valves and connectors, identify

the number of components that are determined to be non-repairable as described in 40 CFR 63.1025(c)(3).

(A) Valves in gas and vapor service and in light liquid service;

(B) Pumps in light liquid service;

(C) Connectors in gas and vapor service and in light liquid service; and,

(D) Agitators in gas and vapor service and in light liquid service.

viii. Where any delay of repair for leaks is utilized, report that delay of repair has occurred and report the number of instances of delay of repair.

ix. For pressure relief devices, report the results of all leak monitoring to show compliance conducted within the semiannual reporting period.

x. Report, if applicable, the initiation of a monthly leak monitoring program for valves.

xi. For each affected heat exchanger system for which the Permittee invokes the delay of repair, include the following information:

(A) The presence of the leak and the date that the leak was detected.

(B) Whether or not the leak has been repaired.

(C) The reason(s) for delay of repair.

(D) If the leak is repaired, the owner or operator shall report the date the leak was successfully repaired.

(E) If the leak remains unrepaired, the expected date of repair.

[40 CFR 63.104(f)(2)]